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THE  
APIARIAN,  
OR,  
A PRACTICAL TREATISE  
ON THE  
MANAGEMENT OF BEES;  
WITH THE  
BEST METHOD OF PREVENTING THE DEPREDA-  
TIONS OF THE BEE MOTH.

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BY WILLIAM M. HALL.

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NEW HAVEN:  
HITCHCOCK & STAFFORD, PRINTERS.

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ENTERED,  
According to Act of Congress, in the year 1840, by  
WILLIAM M. HALL,  
In the Clerk's Office of the District Court of Connecticut District.

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## ADVERTISEMENT.

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THE design of the compiler of this little volume, is to furnish the practical apiarian with all the information necessary for the successful management of bees, without entering into vague speculations or sophistical theories.

It is particularly designed for an accompaniment to the *Self-protecting Bee-hive* ; to enable the manager to use the hive to the greatest possible profit ; and to render the pursuit agreeable, and one of the most profitable sources of rural economy. This hive is offered to the public, with the full belief, that it will answer every purpose that can be expected of a bee-hive.

It is sincerely believed, that no arrangement can be so successfully employed to discharge the filth,

and also to prevent the depredations of the bee moth, as that of the double inclined plane. It has been thoroughly tested by experience, and has produced the most happy effects.

WALLINGFORD, August, 1840.

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## INTRODUCTION.

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### THE HONEY BEE.

THE industrious bee has ever been viewed by intelligent naturalists, with a great degree of interest. The intelligent mind is never weary of its study ; as it contemplates the mysterious operations of nature, and traces its wonderful phenomena up to nature's God. Philosophers, divines, moralists, and the inquisitive minds of all denominations of men, have had their attention arrested by this subject. The cultivation of this branch of husbandry furnishes for our table an innocent luxury, that cannot be excelled ; and it is calculated to raise our contemplation to that divine wisdom, which creates and sustains the infinite variety in the animal world. In treating of bees, it is proper to describe their instinctive powers, form of government, their combination into communities, and each in its individual capacity. The natural instinct of bees is truly wonderful ; nature has taught them to roam abroad several miles distant in search of food, through numberless windings, and after collecting their fill, rise high into the air, and in a direct line return to the hive : nature has also endowed them with instinctive powers sufficient to produce snow-white wax,

from pure honey, and that too in cells of perfect symmetry, from "Sultry India to the Pole;" she has taught the bee to collect honey, prepare wax, perpetuate its race, and has endowed it with all that sagacity, and with those qualities best adapted for its peculiar circumstances, in the sphere of its existence. The bee is no less wonderful in its form of body, than in its instinct and sagacity. The proportion and symmetry is perfect; the harmony in combination of its parts, agreeable to the design of its creation. The bee has a large round eye on each side of its head. It has two strong teeth, which enable it to construct the cells, and to carry from the hive obnoxious substances. Below the teeth is the probossis, and within the mouth a long tongue. The bee has four wings and six legs; in the third pair of legs are two triangular cavities, to which they attach the pellets of pollen, which they carry to the hive; a part of the second pair is provided with what resembles brushes, for brushing off the pollen to be deposited in the hive. At the extremity of the six feet are fangs, with which the bees attach themselves to the sides of the hive, and to each other. The probossis is the principal organ employed in collecting honey; it is defended by a scaly sheath, when inactive. "The stomach consists of two parts, connected by a tube somewhat like the crop of the feathered tribe. In the first apartment, the nectar of flowers is elaborated into honey; in the second, a portion of honey undergoes the action of the digestive powers, and is converted into the use of the laborers. The head of the bee is furnished with two antennæ, by means of which they reciprocally obtain a knowledge of each other, of their

young, and their queen, all communicated by the sense of feeling. It is by these simple organs that they are guided in the dark, and enabled to construct their combs and cells, and to feed their young brood. When deprived of both their antennæ, bees can no longer recognize objects ; their instinctive powers are lost ; and, like Samson after his locks were shorn, they are feeble, helpless, and soon perish." These facts have been demonstrated by that accurate naturalist, Mr. HUBER.

In speaking of a hive of bees, we mean the machine which contains the insects, the smarm, or cluster, designed to form a new family, and which is sometimes called colony. Each perfect hive contains three different kinds of bees ; females or queens, drones or males, and workers or neuters. Not more than one queen can ever live in one hive, and no hive can subsist long without her presence. The drones, of which there are sometimes thousands in the same hive, are called males ; and the remainder are called neuters, from being supposed to belong to neither sex. From the queen the whole race is perpetuated, she being the only bee in the colony that produces eggs. The workers collect honey, form wax, construct combs, and administer to the wants of the young. The females and workers are furnished with a sting, of which the males are destitute. The sting is furnished with several barbs, like those of a dart, which prevents its retraction from the wound it has inflicted, until the discharge of the poison be effected. A liquid poison is injected into the wound by the sting, and if the bee is forced away, the sting is retained, and the bee dies. Queens

are less disposed to sting than the neuter. The three kinds of bees are of different size and appearance, and may be easily recognized. The queen bee is much larger than the common bees, or drones, and may be recognized by her length of body and shortness of wings. The common bees and drones are familiar to observers, the latter being much larger and less active.

# PRACTICAL TREATISE

ON THE

## MANAGEMENT OF BEES.

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### THE QUEEN BEE.

THE queen bee is much larger than either of the other bees, and of different structure, her abdomen being much longer than that of the males, or neuters; she is about eight lines and a half in length, while the drones are seven, and the workers six. The queen is furnished with five yellow rings around her abdomen, and with short wings that scarcely reach the third ring. She is slow in her movements, and is characterized with a great degree of gravity in her march. She never leaves the hive except in leading out a swarm. The government of bees is truly monarchical, as the will of the sovereign is law. She is the mother of the three different kinds of bees that inhabit a hive; and it is to this prerogative that she is indebted for the extreme affection she enjoys from her subjects. The queen being the parent of the hive, it is from her alone that a complete swarm, composed of the three different kinds of bees, can proceed; and without all these different members no colony can long flourish. The queen deposits

a small white egg in each cell for breeding, about half a line long, and of the size of a fine cambric needle. This egg hatches into a small worm or lava, in about three days : a worker remains five days in the vermicular state ; a male six and a half, and a queen five. The worker's worm occupies thirty-six hours in spinning its cocoon ; in three days it changes to a nymph, and on the twentieth day it becomes a perfect winged animal. The queen comes to perfection, after the egg has been laid, in sixteen days ; but the males require twenty-four days. Food is carried to the young as they require it, and great attention is paid to their welfare ; but when ready to be changed to a nymph, the workers are aware that they require it no longer, and prepare to seal up the cell, by a covering of wax of concentric circles, convex, if including males, and flat, if including workers. The same cells may be successively employed for the raising of workers and drones, but every new queen requires a new cell. Immediately on the loss of a queen, the hive is a scene of tumult, and if female eggs are not found in the hive, by which to repair the loss, they must infallibly perish. But if female eggs are found, the loss is soon repaired ; they construct one or more royal cells, place the eggs within the cells, and supply them with food, which is not the common farina on which the young workers feed, but a peculiar paste, or jelly, which is reserved for the queens alone. When reached to maturity, a queen comes forth qualified to fulfill every indispensable function, on which so many thousand lives depend.

The workers have the instinctive knowledge that they cannot, as other insects do, exist individ-

ually; they are constructed, therefore, in so admirable a manner, as to make every thing subservient to the safety and comfort of the mother of the brood. She is in their estimation as much a part of themselves, as an eye or a limb. Their care of her is a kind of self-preservation, a law implanted in every living thing. Though the queen lays several eggs that will be transformed into queens, only one can exist in one colony. If two come forth at the same time, one must die for the welfare of the colony.

Nature has inspired queens with the most deadly animosity towards each other, which nothing but actual death can satisfy. Mr. Huber relates the following remarkable combat of queens: "In one of his hives fittest for observation, two young queens left their cells almost at the same moment. Whenever they observed each other, they rushed together apparently with great fury, and came into such a position, that the antennæ were mutually seized by each others' fangs. The head, breast, and abdomen of the one were opposed to the head, breast, and abdomen of the other. The extremity of their bodies had only to be curved, that they might be reciprocally pierced with the stings, and both fall dead together. But nature has not decreed that the two combatants should perish in the duel: when in the condition now described, they separate, and retreat with the utmost precipitation; and when these rivals felt their extremities about to meet, they disengaged themselves, and each fled away. A few minutes after separating, however, their mutual terror ceased, and they again began to seek each other. Immediately on coming in sight, they again rushed together, seized

one another, and resumed exactly their former position. The result of this encounter was the same. During all this time, the workers were in great agitation ; and the tumult seemed to increase, when the adversaries separated. Twice they interrupted the flight of the queens, seized their limbs, and retained them prisoners about a minute. At last, that queen that was the strongest or the most enraged, darted on her rival at a moment when unperceived, and with her fangs took hold of the origin of her wing, then rising above her, she curved her own body, and inflicted a mortal wound. She withdrew her sting, and likewise quitted her hold of the wing she had seized : the vanquished queen fell down ; dragged herself languidly along, and her strength declining, she soon expired." The antipathy manifested by queens, is not limited to their perfect state, for it extends to nymphs in the cells. That a queen may appear that will dispute her place in the hive, seems to excite suspicion, in a queen already come to maturity. The oldest queen in a hive containing several royal cells, on emerging from her cell, hastens to attack the cells remaining closed, and by dint of labor opens one of the cells, thrusts in her sting, and destroys her approaching rival. When she has left the cell, the bees drag forth the body of a queen scarcely come from the nymphine state. She then attacks and destroys the remaining queens in the royal cells. If two queens hatch about the same time, the workers use every exertion to keep them apart ; knowing, that if they come together, death must be the portion of one of them, they having the same affection for both. If the bees succeed in keeping them apart



for twenty-four hours, one of the queens usually lead out a swarm, to avoid the battle. Queens are not reared in a hive, unless the hive be destitute, which may happen from various causes ; the old queen may have led out a swarm, or died from age or some other cause ; in either case, if female eggs are found in the combs, preparation is immediately made to supply the defect, by building royal cells, which always hang perpendicular in the hive ; and this is done by sacrificing three of the horizontal cells, and permitting the royal cell to occupy their place.

Mr. Schirach, an eminent naturalist, supposes that in certain circumstances the animal destined to become a worker may actually be converted into a queen, and that this conversion is in the power of the bees, by means of a particular mode of treatment bestowed on the worm, while in an early stage. He thence concludes that every queen is originally a worker, which, without the particular treatment bestowed, would have remained a worker, but having undergone this treatment, it is converted to a queen, and that the bees, to attain this conversion, select a worm when three days old.

Many celebrated writers on bees have adopted Schirach's notions with regard to the queen's origin ; but in so doing we must set aside our reasoning powers, and admit that the Almighty, in forming the bee, created them male and female only, and that the worker is the male and the drone the female ; and that the bees seeing the defect, from the egg of the drone created a sovereign. This may appear to the reader to be rather strong language, but if we admit the one, we must submit to the other. When a queen bee ceases to

animate the hive, the bees are conscious of her loss ; after searching for her through the hive for a day or more, they examine the royal cells, which are of a peculiar construction and reversed in position, hanging vertically, with the mouth underneath. If no eggs or larva are to be found in these cells, they then enlarge several of those which are appropriated to the eggs of neuters, and in which *queen eggs have been deposited*. They soon attach a royal cell to the enlarged surface, and the queen bee, enabled now to grow, protrudes itself by degrees into the royal cell, and comes out perfectly formed, to the great pleasure of the bees.

Now this in itself is curious and wonderful. There is no need of adding superhuman powers to an insect, when the simple facts show such singular sagacity. The truth is, that the queen or mother bee lays the neuter eggs in certain cells of a peculiar construction ; in fact, the eggs are laid, at least many of them, as soon as the foundations are begun, before the cells are built. The bees know from the peculiar shape of the egg that it is to have a cell of certain dimensions. When the neuter and drone eggs are deposited, the royal cells are then filled, for abundant observations prove that the queen eggs are laid last.

If the royal cells are not sufficient to hold the queen eggs, they are laid in the common cells, and in the course of the regular business of the hive, these cells are attended to with the rest.

When the larva is of a size to fill the cell, a covering of wax is put on, and here ends the life, or rather the embryo, of the queen ; for no longer having room to expand, it perishes, and is dragged out in the nymph form, as soon as the bees discover that animation is extinct.

If, during the progress of the egg from the larva to the nymph state, the mother queen dies, and there are no eggs in the royal cells, then the bees have recourse to the queen eggs that are laid in the common cells. By enlarging the entrance, and by attaching to it a cell which hangs vertically, they continue the life of the larva, and a queen bee is formed. Here is no work of transformation. The insect is already formed, and nothing remains to be done but the mere mechanical operation of building a habitation which shall be adequate to its wants.

The peculiar organic construction of the queen bee undoubtedly requires a difference of food, as we perceive it does of dwelling.

No doubt it is necessary to supply it more abundantly, and with greater care. The very position it is compelled to take, shows that it requires a different kind of nurture, from either the common bee or the drone. It is wonderful that instinct is so competent to direct these changes; but it would be more wonderful if, in addition to this instinct, the bee had the power to *construct new organs*, as it does different cells, and thus to endow the insect with a different nature.

Another point unsettled, and which is likely to remain forever a secret, is, whether the eggs of the queen are hatched after the manner of the eggs of fish, whether they simply are animated by incubation, or by the care and nourishment bestowed on them by the working or neuter bees.

On this point experiment has proved nothing. The greatest diversity of opinion exists. There are upwards of a thousand writers on the history

and policy of the bee, yet no two have either observed or reasoned alike.

The fecundity of the queen is surprising. Swammerdam affirms, that she contains fifty thousand eggs ; and some authors advance that she may be the mother of one hundred thousand bees in one season. She is marked by peculiarities in addition to her propagating young, of the most conspicuous description. She has every attention paid her that her situation demands. Groups of the workers constantly encircle her ; they brush and lick her limbs, feed her honey ; whenever she moves they accompany her ; and, according to the united sentiments of all, who have studied the nature of bees, pay her what would be real homage, could we allow them the prerogative of understanding. In short, the only security of the workers, is the permanent existence of a queen.

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#### THE WORKING BEES, OR NEUTERS.

The natural history of the bee furnishes much useful instruction to the human mind. The means which the Almighty has chosen for the preservation of bees, is particularly observable.

The mothers, which in almost all other instances are the watchful and tender nurses of their young, we find in this instance, only give them birth. The duty of rearing is committed to substitutes, the workers : and they are as affectionate towards the young of their species, as real mothers of other animals. The workers have been sup-

posed by some to belong to neither sex; but Reim, Huber, and others, by particular experiments, confirmed the fact that some of that class may lay fertile eggs, which produce male bees only.

The working bees are much less in size than the queens or drones; they are armed with a formidable weapon, a sting, which strikes terror into the heart of man or beast, and when irritated, are very free to make use of it. It is the workers on which the welfare of the hive very much depends. Without their aid, the males, females, and even brood, would soon perish. And while the presence of the queen is necessary to their safety, they are no less requisite to her preservation. It is the workers that procure the honey, by their incessant labor, produce the wax, construct the combs, and furnish pollen or bee-bread for the brood. While some are collecting honey, others are collecting pollen, and others guarding the hive; others seldom or never leave the hive, but seem constantly engaged within; they seem to be endowed with a peculiar instinct, directing each one its different task, and without a sufficient number of this class, no colony can possibly prosper. It is the part assigned to the workers also, to clean and prepare the cells appropriated for the embryos, of their own kind, of the queen, and of the drones. After the queen has deposited her eggs, she has no more concern for their welfare, but assigns the task of rearing the young to the workers, which furnish them with pollen, feed them, water, nourish, and keep them warm. A certain degree of animal heat is required, to produce the young, which the bees have the power

to regulate, in a well constructed hive, by clustering by numbers about the cells, more or less as the temperature of the hive requires. If a stranger bee, wasp, or noxious insect appear, it is soon repelled, or destroyed. It is a part of their economy to procure a resinous substance called propolis, or bee glue, with which they seal all crevices about the hive, to seclude air and insects. Some of them act the part of scavengers, by clearing every thing offensive from the hive; such carcasses as are too large for them to remove they embalm, or cover with a thick layer of wax, or glue, under which they may remain, without causing any offensive effluvia.

Such is the peculiar instinct of bees, that not a single inhabitant of another hive is allowed to obtrude himself, but is seized on as a robber and instantly killed. Bees have a sort of language among themselves whereby they know each others' wants; as in feeding each other, &c. They also will sound the alarm when any thing disturbs them; and such sounds will be instantly understood, and answered by the whole colony. If swarms are not immediately removed after they alight, messengers are sent to look a suitable dwelling place for the colony; on their return the intelligence is communicated to the colony, and such is their understanding, that the whole colony rise high into the air, and follow in a direct line with rapid flight, to the place selected by their comrades; if no place is found suitable for a dwelling, they return at night, and another company are sent in search the next morning. If bees are not allowed to possess any thing analogous to reason, the regard for their queen, and

the watchful care of their young, must result from some pleasurable sensations.

After a particular season of the year, the drones are killed off, by those very workers, which formerly watched over them so carefully in their cradles.

It is in the months of July and August, that this singular massacre is effected. Huber, desirous of witnessing the scene of carnage, placed six hives on a glass table, and placed himself and an assistant beneath it. On the fourth of July, the workers actually massacred the males in the whole six hives, at the same hour, and with the same peculiarities. The glass table was covered with bees, full of animation, which flew on the drones, seized them by their antennæ, the wings and limbs, and after having dragged them about, they killed the unfortunate victims, by repeated stings directed between the wings of the abdomen. The moment that the formidable weapon touched them, was the last of their existence; they stretched their wings and expired. Whilst the season continues favorable for the collection of honey, bees labor from the dawn of day till evening; that they never cease to fill their magazines with honey, is not from a foreknowledge that a season is approaching, when their harvest will be denied them, but they are furnished by nature with the means of obtaining their food without thinking, or being capable of thinking of any precautions necessary for that purpose. Their nature requires that they gather honey and wax; they apply themselves during the season of flowers with the greatest assiduity, and on the return of winter their combs are filled with the "luscious

hoard." Reaumur has calculated that within one hour three thousand bees have returned from their collections to a hive whose population did not exceed eighteen thousand, and Swammerdam found nearly four thousand cells constructed in six days, by a new swarm which did not exceed six thousand bees. It is not uncommon among us, for a single swarm to collect from eighty to one hundred pounds of honey in a favorable season. What astonishing industry! Bees collect some part of their honey from what is called honey-dew. This is an exudation found on the leaves of trees in very hot, sultry weather. The oak and the chestnut are the principal trees which produce this substance in any quantity. Repeated observations prove that the secretion of honey is powerfully influenced by the electricity of the atmosphere, and bees never labor more actively than during sultry weather, and when a storm is approaching. The odor exhaled from the hives, and the size of the bees, are sure indications whether the flowers contain honey. Bees are able to store up quantities of pollen when the flowers are destitute of honey, which is necessary for feeding their young; part of it is immediately given to them, and the remainder stored up in the cells. The harvest of honey is early or later, more abundant or scarce, in different years, according to season, and variety of climate, and situation. Sometimes bees will continue in active labor during September, and collect pollen till late in October, if frost does not prevent. On taking up a hive a few years ago, says a writer, the body of a mouse was found entirely encased in propolis, and so effectually embalmed by their own material as to exclude



atmospheric air, and to obviate the possibility of annoyance from putrefaction.

“Embalmed in shroud of glue, the mummy lies—  
No worms invade, no foul miasmas rise.”—EVANS.

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#### REMEDY FOR STINGS OF BEES.

Stings of bees are not often attended with serious consequences, though, when very numerous, may be considered dangerous.

The first point to be attended to, is to extract the sting. The poison ejected into the wound is an acid, and is neutralized by alkalies.

The most simple and effectual remedy is the common table salt. This article may be applied to the wound as soon as the sting is extracted, a little moistened, and it affords immediate relief, and soon abates the swelling. Volatile spirit of ammonia, if applied immediately, relieves the pain almost instantaneously, and if the stings be numerous, should be taken internally, in doses of twenty or thirty drops, every few hours.

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#### OF DRONES AND WORKERS.

A remarkable irregularity subsists in the number of drones, compared with other inhabitants of a hive. “Swammerdam found 693, along with 8494 workers. Previous to the swarming of a large hive, Reaumur counted 700 among 26,000 common bees, and one queen. In another, containing only 2900 workers, he found 693 drones.

He computed 50,000 cells, in the former of which 20,000 were filled with brood. About 2520 cells were appropriated for breeding drones, and above half of them were occupied by larva and nymphs. Thus, including the 700 in the perfect state, he observes that this hive would be provided with above 2000 drones."

An elegant and experienced apiarian in the North American Review for October, 1828, reputed to be Mrs. MARY GRIFFITH, of New Brunswick, New Jersey, observes that "the average number of a hive, or swarm, is from fifteen to twenty thousand bees. Nineteen thousand four hundred and ninety-nine are neuters, or workers, five hundred are drones, and the remaining one is the queen, or mother."

Bees, not unfrequently, rob each other. A courageous swarm will sometimes attack and destroy a neighboring colony, even at a considerable distance, and in a single day, carry off the whole stock of honey to their own hive, compelling the subjugated bees to assist in the spoil. And it sometimes happens that a swarm deficient in honey, abandons its hive and seeks shelter in another, to relieve its necessities. Weak and feeble hives are commonly the objects of attack. Whenever an attack is made on a hive, the planes should be so nearly closed as not to admit of egress or ingress of the bees; the hive being thus protected, the hive belonging to the robbers should be sought, which may be easily found by sprinkling a little flour upon the robbers about the hive, who will soon return to their own hive, bearing marks of roguery. Then with a stick mutilate the comb of the robbers, by breaking it in different parts of the

hive. This being done, the robbers will be occupied in repairing their loss at home ; then open the planes of the attacked hive, and suffer the prisoners, if any, to return to their own home. This done, the attacked hive may be removed a few rods from its original standing place, and there remain in perfect safety.

It seems to be a matter of doubt among apiarians, whether bees enjoy the sense of hearing ; but their organs of sight appear to be very perfect. A bee, on its departure from the hive, makes several evolutions, and then rising in the air, flies in a straight line to the flowery field, and having made its collection, it again rises aloft, and returns in a perfectly straight line, with great velocity, and recognizes its own hive amid numerous others resembling it. The sense of smell enjoyed by bees, is supposed to answer their purpose in traversing the fields in search of flowers, even though several miles distant. Their sense of smell is supposed to be so acute as to scent a field of buckwheat at the distance of five miles.

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#### CONSTRUCTION OF COMBS AND CELLS.

On examining the interior of a bee hive, the view presented to the beholder is of the most interesting character. The curious eye can never be weary of examining these curious work-shops, where thousands are employed in the various departments, for the common good. We are struck in a particular manner with the regularity and exactness observable in their works ; their magazines replenished with every necessary for the support of the society during winter ; and we behold with wonder and pleasure the young brood in their cradles, and the tender care of their nurs-

ing mothers towards them. The construction of these cells, or cradles, is executed with so much art, and the ground-work and form so skillfully contrived, that it must be viewed as an excellent specimen of geometry. The structure of these cells is the best adapted for containing the greatest possible quantity in the least possible space—and have excited admiration in every contemplative mind. The cells are of a hexagonal form; the circumference of one makes a part of the circumference of another; were they contrived in any other shape, there could not be so many cells of equal capaciousness in the same given space.

These cells, which are very thin, are strengthened at the entrance by a fillet of wax, and also at the bottom, by the angle of one falling in the middle of its opposite.

There are in every hive different sorts of combs, adapted to the different sorts of bees which are to be bred in them. The cells constructed for breeding drones are considerable larger than those intended for workers. Those intended for females, or queens, are of a very peculiar form, and fashioned with great labor and skill.

The royal cells are of a pyramidal form, with a wide base, and a long diminished top. They hang perpendicular in the hive, the point downwards. The cells for the drones are three and one third lines in diameter; those of the workers are two and three fifths lines, and these are invariably the dimensions observed in all hives.

A number of cells united constitute the comb, formed in parallel sheets. Reaumur calculated that a comb twelve and a half inches square would contain 9000 cells. The primary object of the cells seems to be for propagating the young; after these have gained maturity, they are cleaned out

and filled with honey ; but there are cells, also, destined for this purpose from the beginning. The same cells may be employed for several successive broods, and when the whole have come to perfection, they are appropriated for the winter stores. In the shape and size of the comb, bees are guided by circumstances : a small cavity is totally filled with equal combs, in parallel sheets ; while in one of greater dimensions, there may be some large, and others not one fourth of the size.

It may appear singular how bees can fill a horizontal cell quite full of honey, and yet prevent it from escaping. Perhaps it is partly retained by its own viscosity, and from adhesion to the sides of a tube of such small diameter. Each cell is sealed with a flat covering of wax, most ingeniously devised. A circle is formed round the mouth of the cell, which is gradually diminished by other concentric circles, until the aperture remains a point capable of being filled by a single grain of wax. Thus we see the combs and cells constructed with profound skill, seeming to display the work of a geometrician. It is self-evident that here the geometrician is the author of the insect.

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#### WAX, HONEY, AND BEE BREAD.

A variety of experiments render it certain that wax is produced from pure honey. In ascertaining the mode by which wax was produced from honey, Huber confined a swarm of bees in a straw hive, to an apartment along with a quantity of honey and water, necessary for their subsistence. The honey was exhausted in five days, and five combs of snow-white wax were then found suspended from the arch of the hive. Lest this might have been the produce of the farina carried

in by the bees when their confinement commenced, all the combs were removed, and the imprisonment of the bees repeated. But the result was the same ; they formed other five combs of the finest and whitest wax.

Honey is the richest extracts from the finest flowers. It is a vegetable secretion which appears at different seasons of the year, especially when flowers in general are in blossom. The bees lick it from the flowers with their tongue and proboscis ; it is swallowed, and on their return to the hive is disgorged, not from the trunk, but from the mouth, into the cells. The best sort of honey is made from the white clover and mignonette, from which it is produced in great abundance ; it is of a whitish color, inclining to yellow, of a thick consistence, possessing an agreeable smell, and a pleasant taste. The comb first made by a swarm, is of the purest and most delicate white, and the honey which it contains is light colored, and of delicious flavor, and is called virgin honey.

Honey is the source of wax, and the food of bees. Being a vegetable production, the quantity of honey depends entirely on the nature of the plants from which it is produced. Honey produced from buckwheat is of a reddish color, thin, transparent, and of an unpleasant flavor. It is produced in great abundance. It is not uncommon for a single swarm to increase the weight of their hive, during the season of buckwheat, which continues from the first of August to the middle of September, from thirty to forty pounds.

Bee bread, during the spring, summer, and till late in the fall, is brought home by the bees in the hollow of their legs. This is the farina, of pollen, obtained from various sorts of flowers or

plants. This was formerly supposed to be wax; but it is now known that no principal of wax resides in pollen; it is collected solely for the purpose of feeding the young brood, and the perfect bees never live upon it; but the workers take it, grain by grain, in their teeth, and transmit it to the mouths of the larva. Honey, in the comb, may be kept in the drawers in which it is made, during the whole winter, allowing it to remain exactly as the bees formed it. To separate honey from the comb, let it be cut in small pieces, and suspended near the fire, in a canvas bag. The wax may be purified by putting the comb, tied up in a linen or woolen bag, into a vessel of water, over the fire; as the heat increases, the wax liquifies, and escaping through the bag, rises to the surface; it may be skimmed off, while the refuse is retained behind. It may be well to place some weight on, or in the bag, to prevent it from rising to the surface.

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#### SWARMING.

There seems to be no satisfactory reason given, by authors, for the swarming of bees. It is generally supposed that swarming ensues in consequence of the hive being overstocked with numbers, and from a young queen seeking a new dwelling, where she may be placed in "royal state," at the head of a colony. It is seldom that bees swarn from a hive until it is filled, or nearly filled. Still, the want of room cannot, in all instances, be the sole cause of swarming; and, instead of a young queen, it is always the old queen that leads out a swarm, and the same old queen that leads out a swarm this year, will lead out a swarm from her new habitation the next year. An old queen never leaves the hive until she has deposited eggs

that will become new queens, nor until her principal laying of eggs, producing drones, is over.

Bees usually swarm from the 10th of May to the middle of July ; early swarms are of the most value. A swarm of bees in May, in the Self-protecting Hive, is worth, to the possessor, at least fifty dollars, the interest of which is at six per cent. three dollars. Now, suppose the hive to yield, the first season, thirty pounds of surplus honey, which is always of virgin whiteness, worth in our market twenty-five cents the pound, which is seven dollars and fifty cents. Suppose the hive to cost one dollar and fifty cents, which is the actual cost, if well made, of good materials. We have now a balance of three dollars, after deducting interest and cost of hive. The estimate of surplus honey is very low ; I have already taken thirty-five pounds each, (the 1st of August,) from many of my May swarms. We have left a balance of three dollars, to pay the trouble of hiving, wintering, &c. Suppose our stock of bees to send out a swarm, on the 20th of May next ; our stock is now doubled, or worth 100 dollars. It is reasonable to expect second swarms enough to defray subsequent expenses. We may now calculate our stock of bees to double every subsequent season, as well as the surplus honey. Let us calculate this increase of property for five years. On the first of October, the first year, we have two stocks of bees, worth one hundred dollars, or fifty dollars each, besides sixty pounds of surplus, or drawer honey ; and by this ratio at the end of five years we have thirty-two stocks of bees, according to the former estimate worth 1600 dollars, besides 30 pounds of surplus honey from each hive, each season, amounting to 1860 pounds of virgin honey ; allowing 20 cents a pound to be the wholesale



price, worth 372 dollars, which, added to our stock of bees, is 1972 dollars,—a very handsome capital acquired by judicious management and a very small amount of labor.

We have now enlarged our stock of bees to as many hives as would be profitable to keep in one apiary. We are now prepared to sell thirty stocks of bees every subsequent season, at the selling price, (not at the real worth,) which is about ten dollars the hive, in the Self-protecting Hive, amounting to \$300, together with 900 lbs. of virgin honey, at 20 cents, amounting to \$180, making a yearly increase of \$480. And this may be done by the man that owns one acre of land, as well as by the man that owns one hundred acres.

The best and most cogent reason given for second swarms is, that after the old queen has lead out a swarm, the remaining bees finding themselves without a leader, prepare to erect royal cells, and raise young queens to repair their loss. They select female eggs, (which the old queen always leaves the hive abundantly supplied with, on leading out a swarm,) and place them in the royal cells, feed them royal jelly, and in about twelve days are supplied with one young queen, or more. If more than one queen is produced, the queen that first leaves the cell, often leads out a second swarm, to avoid a battle with its expected rival. Second swarms usually appear in about twelve days after the first swarm.

It may be very accurately ascertained whether a second swarm may be expected by hearkening at the entrance of the hive the evening before the swarm appears. If a second swarm is to issue, a distinct sound will be heard from each of the queens, consisting of monotonous notes, replying to each other, called sounding the alarm. This

sound may usually be heard about eighteen hours before swarming. Third swarms may be expected in about three days after the second swarm, which should always be returned either to the old stock, or to the second swarm. This may be easily done by taking away their queen ; and by placing them at the entrance of either hive, they eagerly enter.

One chief cause or concomitant of swarming, says Huber, apparently consists in the agitation of the queen. She is suddenly affected, hastily traverses the combs, abandoning that slow and steady progression which she ordinarily exhibits ; her agitation is communicated to the bees ; they crowd to the outlet of the hive, and the queen escaping first, they haste to follow her.

Commonly, the whole take but a short flight, and the queen having alighted, they all cluster around her. This constitutes the new swarm. Huber states that the agitation of the female excites the workers, which increases their animal heat, and raises the temperature of the hive to such an insupportable degree, that they are compelled to leave it. On issuing from the hive, bees appear to have no object in view.

After rising in the air, it is commonly some shrub, or tree, that arrests their progress, and whenever the queen alights, the bees will cluster around her. They hang in this situation, usually, until some cavity or hollow tree has been selected for them to inhabit, when they loose their hold, fly high in the air, and direct themselves in a straight line to their new habitation.

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#### THE BEST CONSTRUCTED HIVE.

Hall's Patent Self-protecting Hive is to be preferred above all others, particularly for an out-

door's hive. The easy management, the perfect simplicity of its construction, and the happy effects produced by the double inclined plane, in discharging all filth that falls upon it, in ventilating the hive, in furnishing an easy and convenient place for the bees to alight and enter at the leeward of the hive, and also the very convenient manner in which the surplus honey may be taken, by means of drawers and sliders, without being exposed to the danger of a single sting, render it highly desirable by every apiarian acquainted with it.

The above hive is made of seasoned inch boards, twelve inches and a half square on the outside, fourteen inches deep, from the chamber to the protector. The chamber is six inches, and the protector or base is four inches, making the whole height of the hive two feet. The chamber is furnished with two communicating drawers, with glass ends in front, designed for taking the surplus honey, without destroying a single bee. The drawers, when filled, may be carefully taken out at the rear of the hive, by opening the door and inserting two right angled slides, carefully taking one of the sliders out with the drawer, to prevent the bees from issuing out of the drawer; and letting the other slider remain, to prevent the bees from rushing into the chamber, until an empty drawer is inserted. Carry the drawer taken out into a cellar or some dark place; then by opening a window, and by placing the communication aperture toward the light, the bees will soon escape and return to the hive, leaving the honey for the owner. The body of the hive consists of a perpendicular box of the common form, furnished with two cross bars or supporters in the centre; in the chamber floor are two or more apertures,

corresponding exactly with apertures in the drawers above, to enable the bees to enter the drawers. If the body of the hive is filled, the drawers, if filled, are taken out, and others inserted in their stead ; but if it is not, one or both of the drawers are suffered to remain for the benefit of the bees, according to circumstances. The base or protector consists of a square frame without top or bottom, of the exact size of the hive, about four inches deep, on which the hive rests, being connected and held in place by dowels and hooks. The front and rear sides of the base are narrower by about an inch than the other sides, leaving room at the bottom for the play of the inclined planes, which form a bottom for the hive, consisting of two inclined planes, slanting from the top of the base to the bottom. These inclined planes consist of boards hung within the box of the base, on pivots passing through the sides near the top edge of the centre of the sides, and extending below the lower edge of the base in front and rear, with a play of about half an inch, to admit freely the egress and ingress of the bees, as well as the discharge of filth. The cap or top of the hive should project about an inch, to discharge the water without injuring the hive. The hive should hang in a frame by cleats, made fast to the sides of the hive and nailed to the chamber floor. This frame, in which the hive should be suspended about two feet from the ground, may be made of four posts four feet high, with suitable cleats for the hive to rest upon, and also to brace the posts.

The above described hive should be made of good deal boards free from flaws and cracks, and perfectly smooth inside and outside, with the exception of the under side of the chamber floor, which should be left rough, that the bees may be

enabled to hold the weight of their swarm, when first entering the hive. If made perfectly smooth, the weight of the swarm will cause them to fall, thereby irritating them, and sometimes causing them to leave the hive. The old fashioned clumsy hives, so formed that the honey cannot be taken out without destroying the bees, should be forever discarded.

Much has been said of the fittest size of a hive. The Self-protecting Hive, as described above, is of sufficient size for ordinary purposes. The body of the hive contains about 35 pounds of honey, and the drawers about 20 pounds. The body of the hive contains a sufficient quantity to supply the largest swarm during winter, and is of the most suitable size to produce swarms. In very large hives bees seldom swarm, and if at all, usually very late, rendering the swarm of but little worth. Some are in favor of very large hives, in order to prevent swarming, but such are persons usually of but little experience as apiarians. True, some may keep bees merely out of curiosity, but generally the principal object is profit. If, in the cultivation of bees, profit is thought of, they should be suffered to swarm at least once in each season, and be furnished with suitable sized hives for that purpose. Many of my hives swarm twice, and I am very glad to have them do so. Second swarms, if obtained by the 10th of June, although small at first, soon increase in numbers, fill their hive and make as good stocks for wintering as first swarms.

Nature has designed that bees should swarm. "My own experiment," says Dr. Thatcher, "the past summer, affords no encouragement to prosecute the scheme of interrupting the natural swarming of bees. Having placed empty hives in con-

tact with those containing bees, with apertures of communication, they occupied the hives as drawing rooms, during the summer, and prevented swarms forming; but in autumn they all returned to the parent hives, having made no comb, except a small quantity in one of the hives. The principal is a substantial one, that bees will not prosper unless they are furnished with queens, and I am not endowed with the gracious prerogative of elevating females to thrones." Let us suppose a swarm of bees to be put into a hive of sufficient capaciousness to prevent its swarming. At the end of five years, allowing the swarm to yield fifty pounds of surplus honey each year, which is a fair estimate, we have two hundred and fifty pounds of honey, and one swarm. Now let us compare this with our former estimate, allowing swarms to issue. In our former estimate, allowing the bees to swarm, at the end of five years we have thirty-two swarms, besides eighteen hundred and sixty pounds of surplus honey; leaving a balance of thirty-one swarms and sixteen hundred and ten pounds of surplus honey in favor of swarming.

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#### HIVING SWARMS, AND TRANSFERRING BEES FROM ONE HIVE TO ANOTHER.

In the season of swarming, constant watchfulness should be kept over the apiary; if it consist of a considerable number of hives, several swarms may be expected every fair day. Suitable hives should be in readiness to receive the swarms, furnished with drawers and perfectly tight and clean in every part. Nothing is lost by employing good workmen to make your bee-hives; they should be made of good materials, and

thoroughly painted. Pine or butternut boards may be considered preferable to any other. It has commonly been the practice of apiarians to rub the inside of the hive with various kinds of herbs, a solution of salt and water, honey, rum, and various other substances. All they require is a clean, dry hive, of a proper size.

Hives and drawers should be made all of one size, so that one drawer may fit every hive; thereby saving much inconvenience in furnishing the hive with a second set of drawers. Place a table near where the swarm alights, in the shade, and when they are quietly settled on a branch of a tree or shrub, one person may hold the hive with the protector taken off directly under the swarm, and an assistant give the branch a sudden shake, by which the bees fall into the hive; or if the branch be small and of little worth, a better way is to place the table directly under the swarm; then with a saw or knife sever the branch from the tree, place it on the table and set the hive immediately over it; the hive should be raised a few inches from the table, by placing sticks upon it, to allow the scattering bees to enter. If the swarm should settle on some inconvenient place, as the post of a fence, trunk of a tree, or eaves of a house, the bees must be carefully brushed into the hive with a wing or broom, and the hive immediately placed upon the table raised by sticks, as before. It not unfrequently happens, that from some dislike of the hive the bees return to the branch from which they were taken, even the second and third time.

Should they return to the parent hive, they will issue from it again in a few days. It sometimes happens that two swarms issue from different hives at the same time and alight together.

These may be put into one hive, and the queens decide which shall have the sovereignty. At evening the hive should be carefully placed upon the protector, hooked up, and carried to the place where it is to hang ; the planes should be then unhooked and opened about half an inch, to ventilate the hive, and also to admit the free passage of the bees. Although bees indicate less disposition to sting during swarming than at any other time, persons hiving them should be provided with a dress that will effectually secure them from their stings, and particular care should be taken not to injure or irritate them. The most convenient defense will be a covering of millenet or other open stuff, put over a hat enclosing the whole head and neck, and a pair of woolen gloves drawn up over the wrist. When approaching bees, the smoke arising from tobacco or burning leather, is the most effectual means of rendering them mild and harmless. The human breath is very offensive to bees ; breathing on them excites their greatest rage ; but you may blow upon them with bellows without offense. Should bees on any occasion make an assault on a person, it will avail nothing to fight or oppose them, but stand quietly in one position or walk moderately away from them.

It is very important to have large strong swarms in a hive, and when a swarm is too small, two or more should be united. If the old stock should be in the common box hive, it may be transferred to the hive containing the second swarm, thereby saving the honey in the old hive, and furnishing a good stock of bees for the new. This may be done by turning the old hive bottom upwards, and immediately placing the mouth of the hive containing the second swarm, with the protector



taken off, above the old hive, at the same time corking some tow or rags between the hives, to prevent the bees rushing out, if the mouths do not exactly fit; then by a continued rapping on the sides of the old hive, the bees will ascend and join the young colony. In about the space of half an hour the new hive may be taken off, the protector hooked on and placed in the exact situation of the old hive. The old hive may now be removed a few rods and remain bottom upwards for the night; in the morning, by rapping again upon the sides of the old hive, if any bees remain they will immediately fly to, and enter the new hive, or if the bees refuse to leave the old hive, it may be taken in pieces and the bees carefully brushed from the combs, and the honey removed to some place of deposit; in the last case the only resort for the bees is to join the new colony, which is immediately done. Bees may be transferred to empty hives in the same manner as to hives containing bees. In either case care should be taken to place the new hive in the exact situation of the old. The prosperity of the colony depends much on the time of transferring. The time of transferring to an empty hive, should be in about fifteen days after the first swarm has issued, that the hive may be furnished with a queen to govern the colony. If transferred before the colony is furnished with a queen, the bees will soon disappear; either join a neighboring colony or die. I have this season taken four stocks of bees from my own apiary, and transferred them to empty hives with perfect success. Transferring should be done as early in the season as practicable, that the bees may be enabled to gather honey sufficient for wintering.

In every apiary, the empty hives should be

weighed and marked, that the quantity of honey within may be ascertained.

The practical directions given by writers for the weight of a good swarm, are not, perhaps, perfectly correct; writers differ in regard to the number required to weigh a pound. A swarm weighing four pounds, is supposed to contain about twenty thousand bees, and the best swarms seldom weigh more than six pounds.

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#### ARTIFICIAL SWARMS.

Artificial swarms may be produced by taking brood comb from the lower part of the hive, in the month of April, or first part of May. The comb taken, should contain brood three days old or less; place it in one or both of the drawers in a perpendicular position, then remove the old hive some distance from the apiary, place the new hive containing the brood, where the old one hung in the apiary. The bees now returning from the field, and finding a hive like that which they had left, lodge themselves there, nourish the brood, and from the brood, produce a queen and prosper. Swarms formed thus early, have all the advantages of early blossoms, and although few in numbers at first, after being furnished with their new queen increase rapid, and in a good season make a tolerable stock hive.

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#### SITUATION OF AN APIARY.

An apiary should be situated in a quiet place, where the bees may perform their labors undis-

turbed. It should not be encompassed by high walls, or thickets, which would impede the progress of the bees on their return heavy laden to their hives. The ground about the hives should be kept clear of weeds and grass, which afford a harbor for vermin. The apiary should be situated at a convenient distance from the dwelling-house, that it may receive the required attention. For the facility of swarming and hiving, it is better to have low trees and flowering shrubs, than lofty trees, in the vicinity. It is unimportant whether any particular direction be selected, as bees will flourish and make their collections, whatever be the position of their dwelling.

Those who desire great profit from an extensive bee establishment, should cultivate in their gardens such plants as afford honey in the greatest abundance. The first to be mentioned is *mignonette*: this affords honey in great abundance, and of the finest quality. Broomwich, an experienced apiarian, relates that in the year 1779, he planted a great quantity of it in front of two bee-hives, at a considerable distance from any other bees. In September he took the honey and found it to exceed, by above a third, what he obtained from any other two of his best hives, where the bees were obliged to fly further, and it was equal in color and fragrance to honey from any country. Another plant rich in nectary, is the *Crocus*, in its various species.

Water is an essential article among bees; they cannot subsist and nourish the young brood, destitute of water. When running brooks are not found near an apiary, small shallow rivulets should be provided for their use, with small stones or sticks for them to stand upon.

The best constructed apiary that has met my

eye, is my own. My apiary is three feet wide, with corner posts set about two feet in the ground, to prevent it from blowing over: the posts are about four feet high from the surface of the ground, with plates and double roof; two girders, one on each side, are placed about two feet four inches from the under side of the plates; standards are morticed into the girders, with ties on the top for the cleats on the sides of the hives to rest upon; these standards are thirteen inches apart, to receive the hives between them, and twenty inches high above the girders; the space between the hives is about twelve inches; the floor rests upon a groove in the girders, which I take out during the warm season; at the sides are doors that may be taken away or closed at pleasure; the ends are thoroughly boarded up as low as the girders, and the whole substantially made of the best materials, and painted. When the whole is closed, it is perfectly dark like night, and secure. In this situation my bees remain during winter. They consume one third less honey, than when exposed to the light; and my hives are better stocked with bees, and swarm earlier, than in the ordinary way. Bees enclosed in the apiary are kept perfectly dry, and remain quiet from November until March, when one of the doors should be removed. I remove the one most exposed to the sun, that the bees may be kept warm as possible in such a situation, during the months of March and April. Bees kept in the apiary during winter, as in every other situation, should be ventilated, by suffering the planes to remain open about half an inch, to prevent suffocation, and also that the bees that die and other filth may be discharged; thereby preserving the health of the bees. Bees when exposed to the variety of weather during winter, require at least one third

more food, besides decreasing very much in number. Bees, when exposed, frequently issue from the hive in great numbers, during a sunny day in winter, with the earth clad with snow. Every bee that chances to alight upon snow, is sure to find a cold grave; being immediately chilled, and therefore unable to return to the hive. Those bees that return to the hive, enter with an increased appetite, devouring more honey in one hour, than they would have done in one week, had they remained inactive.

White clover affords the best field pasturage for bees, and it may serve the agriculturist a double purpose, as it affords the richest pasture for fattening cattle, and may with profit be extensively cultivated. Buckwheat should be cultivated by every apiarian suitably situated. It may be cultivated to the greatest profit the last part of the season, and it very happily takes the place of white clover. The honey extracted from buckwheat is not so rich and delicate as that from the white clover; but it answers a very good purpose for the bees to winter on, and is furnished in great abundance. Waldrige, a German writer, states that he saw forty large bee-hives filled with honey, to the amount of seventy pounds each, in one fortnight, by their being placed near a large field of buckwheat in flower.

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#### BEST METHOD OF DESTROYING OR PREVENTING THE RAVAGES OF THE BEE MOTH.

The true bee moth is a native of Europe, but has been transplanted and naturalized in this country. It has been known to exist in this country about sixty years, and it is supposed by some to

have been introduced here, with that filthy, loathsome, and worst of all trees, the Lombardy poplar. Be that as it may, we have it, and are always likely to have it in greater or less number. Thousands of stocks of bees are destroyed by this little insect in our country annually. The bee moth has become so common in New England and the middle and western States, and its success in destroying the bee so complete, that very many apiarians have become discouraged, and abandoned the enterprise. Much time and money has been spent in devising some plan of destroying the bee moth, and of exterminating its race. But it is generally conceded that the moth cannot be exterminated, as it is not confined exclusively to our apiaries, but is found among bees in cavities of rocks and trees, and sometimes in the nests of the humble bee. Since the extermination of the race cannot be effected, the only alternative for apiarians, is to use every exertion in their power to prevent it ravages. This may be effected by using the Self-protecting Hive.

The double inclined plane at the base of the hive, is undoubtedly the best possible plan of securing the bees against the ravages of the moth, without interfering with the natural course of the bee. Many plans have been adopted by apiarians, to prevent this loathsome insect from destroying their favorite. But all, except the base of the Self-protecting Hive, have either failed to accomplish the object of its originator, or interfered with the natural course of the bee. Some have adopted the use of large hives, situated within their dwellings, with the base of the hive some distance below the bees, with the design for apiarians to brush out the worms, when they shall have been thrown down by the bees. But this

does not have the desired effect. It not only fails to prevent the moth, but interferes with the course of nature: it interferes with the course of nature in preventing the bees swarming; and it fails to prevent the destruction by worms, from the fact, that persons cannot always stand in readiness to brush out the worms, when the bees shall have thrown them down, before they have time to ascend into the top of the hive among the combs. Some use the single plane suspended below the hive by means of wires, (and this plan is secured by patent;) this plan operates also against nature, besides it is not so good a conductor of filth, as the double plane, from the fact that it has double the distance to move after reaching the plane; and cannot consistently be made with the same descent. It operates against nature, from the fact that every bee that alights upon the plane, is again obliged to fly to enter the hive, instead of crawl, as it is natural for them to do. Bees, after alighting upon the suspended plane, traverse for some length of time, before attempting to fly to the comb, and this is done every time they return to the hive, which is proof conclusive that nature has designed that they should travel, instead of fly, to their comb; this operates worse upon the bees in the first part of the season, during the months of March and April, when the bees go abroad in search of pollen. On returning to the hive, frequently partially benumbed, they wander about the plane, in search of some place to crawl to the combs, and finally perish for the want of strength to fly, and this too at a season of the year when their numbers are most wanted to produce animal heat sufficient to propagate the young.

The moth enters the hive during the night, and deposits its eggs.

This loathsome insect is suffered to enter the hive usually unmolested, it accomplishes its object, and leaves the hive to die. The moth is of the butterfly form, small size, of a grayish color, and makes its appearance about the first of May, and continues till Autumn : usually till about the first of October. The eggs hatch in about two weeks, and produce very small worms, which in a well populated hive are immediately seized by the bees, and thrown to the bottom of the hive ; if this bottom be the double inclined plane, instead of returning to the combs, they are immediately discharged to the ground, from whence they cannot return. On the common platform in the box hive, the young worm on being thrown down from the combs, immediately crawls up the sides of the hive, and continues to crawl up when thrown down by the bees, until it is of sufficient size to spin its web, when it is no longer assailed by the bees, but suffered to commit its nefarious depredations unmolested ; its cocoon being impenetrable by the bees. By addition of numbers, the brood of the bees is soon destroyed, the bees routed, and the victors take possession of the spoil. They feed on the wax and comb, devouring in their march the cells which contain the eggs and the young brood of bees, until they are wholly destroyed. Having, at length, attained their full size and maturity, the worms are changed into a chrysalis state, their bodies are contracted within their cocoon, they cease to feed, and in due time are transformed into a winged insect, the true bee moth. The length of the worm when full grown, is about an inch ; and I have seen them at their full size early in April.



## MANAGEMENT OF HIVES DURING WINTER.

It has long been a custom for the apiarian, to select a certain number of hives from his apiary, for wintering, and to suffocate the remainder. This practice should be abandoned. It is like killing a favorite horse for his skin ; for the bees are usually worth four times as much as the honey obtained. If you have late swarms that do not obtain honey sufficient for wintering, feed them by inserting a drawer of honey, in October, that they may learn a passage to it, before the setting in of winter. A late swarm, if wintered, will the second season fill up their hive and make double the amount of surplus honey that would have been obtained, had the bees been suffocated the first season, besides a good stock of bees, and perhaps one or two swarms.

It is not only a disagreeable job to suffocate bees, but certainly a great waste of property.

Various notions prevail with regard to the wintering of bees. Some prefer to have them remain in the same situation in winter, as they have done through the summer ; some bury them by digging a hole in the side of a sand bank, below frost, then placing a plank in the bottom for the hives to stand upon, carefully covering them with straw, and last of all, thoroughly covering them with dirt. The bees remain in this situation until spring, when they are uncovered, taken out, and placed in the apiary. Bees will undoubtedly live, and consume but very little honey, in this situation ; but the comb is apt to mould and often injure the bees. But a much better plan is to take your bees from their hanging frame, carry them to some spare room in your

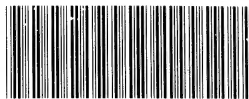
house, place your hives on benches, to prevent mice from annoying them, open the planes about half an inch, that the hive may be sufficiently ventilated, make your windows quite dark, and in this situation let your bees remain from November until March ; when they may be removed to their hanging frames from whence they were taken. A very suitable frame for suspending a single hive, may be made by setting four small posts, four feet long, about six inches in the ground, two feet square at the bottom ; one way eighteen inches apart at top, and the other way twelve and a half inches, to receive the hive between the posts ; the posts should be furnished with cleats, for the cleats on the hive to rest upon, and thoroughly braced to prevent their spreading.

If a hive contain twenty-five pounds of honey and comb, in November, no farther attention is required, as respects their food.

Bees, after once located in the spring, should not be removed unless at a considerable distance : they may be removed miles with perfect safety, but to remove them a few rods is surely destructive to them ; nature has taught them to return from the field to their old location, and seldom more than one half of the workers find their new situation. I have known whole colonies destroyed by two or three removals during one season. If the bees are not all lost they are reduced so low as to be unable to guard the combs, thereby exposing the interior of the hive to their merciless foe, the bee moth, which eagerly enters, and under such circumstances, soon takes possession of the hive.



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